

From dona@tridelta.com Thu Sep 05 09:40:47 1996  
Received: from wariat.apk.net (uucp@wariat.wariat.org [192.147.147.1]) by tapr.org (8.7.5/8.7.3/1.9) with ESMTP id JAA24412 for <hfsig@tapr.org>; Thu, 5 Sep 1996 09:40:46 -0500 (CDT)  
Received: (from uucp@localhost) by wariat.apk.net (8.7.5/8.7.3) id KAA19650 for hfsig@tapr.org; Thu, 5 Sep 1996 10:41:16 -0400 (EDT)  
>Received: from sparcy.tridelta.com (sparcy [192.160.168.222]) by tdi3.tridelta.com (8.6.9/8.6.9) with ESMTP id KAA13603 for <hfsig@tapr.org>; Thu, 5 Sep 1996 10:18:39 -0400  
Received: from sparcy.tridelta.com (sparcy [192.160.168.222]) by tdi3.tridelta.com (8.6.9/8.6.9) with ESMTP id KAA13603 for <hfsig@tapr.org>; Thu, 5 Sep 1996 10:18:39 -0400  
Received: from donapc.tridelta.com (donapc.tridelta.com [192.160.168.70]) by sparcy.tridelta.com (8.7.1/8.7.1) with SMTP id KAA22674 for <hfsig@tapr.org>; Thu, 5 Sep 1996 10:19:11 -0400 (EDT)  
Date: Thu, 5 Sep 1996 10:19:11 -0400 (EDT)  
Message-Id: <199609051419.KAA22674@sparcy.tridelta.com>  
X-Sender: dona@sparcy  
X-Mailer: Windows Eudora Version 1.4.4  
Mime-Version: 1.0  
To: hfsig@tapr.org  
From: dona@tridelta.com (Don Adams)  
Content-Type: text/plain; charset="us-ascii"

I've been searching the internet for a few evenings.  
I found some abstracts  
at <http://sun4.iaee.tuwien.ac.at/jb9495/ber20002.html>  
<http://www.ee.ed.ac.uk/profiles/research/SaS/SaS-info.html>  
that were interesting concerning a RAKE tracking filter.(?!)  
It claims to be a filter or correlator  
that needed "no prior knowledge of the signal". and can  
correct multipath distortion.

Does anyone know what this really is?

Over and Out Don

From karn@qualcomm.com Thu Sep 05 13:55:18 1996  
Received: from servo.qualcomm.com (servo.qualcomm.com [129.46.101.170]) by tapr.org (8.7.5/8.7.3/1.9) with ESMTP id NAA14834 for <hfsig@tapr.org>; Thu, 5 Sep 1996 13:55:15 -0500 (CDT)  
Received: (from karn@localhost) by servo.qualcomm.com (8.7.5/1.0/8.7.2/1.9) id LAA12594; Thu, 5 Sep 1996 11:54:43 -0700 (PDT)  
Date: Thu, 5 Sep 1996 11:54:43 -0700 (PDT)  
From: Phil Karn <karn@qualcomm.com>  
Message-Id: <199609051854.LAA12594@servo.qualcomm.com>  
To: hfsig@tapr.org  
In-reply-to: <199609051419.KAA22674@sparcy.tridelta.com> (dona@tridelta.com)  
Subject: Re: [HFSIG:1522]

Don,

I haven't looked at the article yet, but a RAKE receiver is a multichannel spread spectrum receiver that tracks the individual multipath components of a signal and then combines them before demodulation. We rely pretty heavily on them in Qualcomm's IS-95 CDMA system.

The basic idea of a RAKE dates from the late 1950s.

To resolve individual multipath components, the time delay between them must be at least one chip. This corresponds to a spreading bandwidth equal to or greater than the reciprocal of the delay.

Alternatively, this corresponds to the spreading bandwidth being greater than the coherence bandwidth of the channel. Think of the channel as imposing a time-varying comb filter on your signal. If the signal is wide compared to the frequency interval between the "teeth" of the comb, then the comb is very unlikely to remove all of the signal at once. This is frequency diversity in action.

I don't know of any way that a RAKE receiver can be used on a narrowband signal. If the narrowband signal falls into one of the notches in the comb, nothing can bring it back. You then need other forms of diversity (time, space).

Phil

From Robert.Glassey@nmp.nokia.com Tue Sep 10 05:49:56 1996  
Received: from noknic.nokia.com (noknic.nokia.com [131.228.6.10]) by tapr.org (8.7.5/8.7.3/1.9) with SMTP id FAA17673 for <hfsig@tapr.org>; Tue, 10 Sep 1996 05:49:44 -0500 (CDT)  
From: Robert.Glassey@nmp.nokia.com  
Received: from samail01.nmp.nokia.com (samail01.nmp.nokia.com [131.228.240.6]) by noknic.nokia.com (8.6.9/8.6.9) with ESMTP id LAA20659 for <hfsig@tapr.org>; Tue, 10 Sep 1996 11:10:30 +0300  
Received: from by samail01.nmp.nokia.com with SMTP (1.37.109.16/16.2) id AA055183107; Tue, 10 Sep 1996 11:11:48 +0300  
X-Openmail-Hops: 2  
Date: Mon, 9 Sep 96 18:09:52 +0100  
Message-Id: <H000029202618415@MHS>  
Subject: Johan's modem  
Mime-Version: 1.0  
To: hfsig@tapr.org  
Content-Type: text/plain; charset=ISO-8859-1; name="Johan's"  
Content-Transfer-Encoding: 7bit

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was longer and more random.

Can you demodulate this waveform? if so how? What do you lock to? Is there a proper constalation?

Cheers,

Rob, G0VTQ

From forrerj@peak.org Tue Sep 10 11:27:00 1996  
Received: from PEAK.ORG (root@PEAK.ORG [198.68.22.17]) by tapr.org (8.7.5/8.7.3/1.9) with SMTP id LAA00317 for <hfsig@tapr.org>; Tue, 10 Sep 1996 11:26:58 -0500 (CDT)  
Received: from p05.t0.monrotel.com (p05.t0.monrotel.com [198.68.25.38]) by PEAK.ORG (8.6.13/8.6.7) with SMTP id JAA20048 for <hfsig@tapr.org>; Tue, 10 Sep 1996 09:26:59 -0700  
Message-Id: <199609101626.JAA20048@PEAK.ORG>  
X-Sender: forrerj@peak.org (Unverified)  
X-Mailer: Windows Eudora Version 1.4.4  
Mime-Version: 1.0  
Content-Type: text/plain; charset="us-ascii"  
Date: Tue, 10 Sep 1996 09:20:30 -0800  
To: hfsig@tapr.org  
From: forrerj@peak.org (Johan Forrer)  
Subject: Re: [HFSIG:1524] Johan's modem

>Hi,

>

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>load them into matlab, and I can see the 4 modulated tones, and I can  
>see amplitude and phase modulation on each one, but I cannot extract any  
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Hi Rob,

Pleased to see your interest in the waveforms. A few suggestions that may put you on the right track:

I do have demodulators that goes with each of the sample waveforms, so rest assured, the signals can be demodulated and produce text-book constellations. All the waveforms are QPSK, so you need a QPSK demodulator(s). You may use

coherent or non-coherent demodulation, and as the S/N is very good, you should have no problem to phase lock - at least I that is my experience. For detection, a matched filter works best, also keep in mind that these are RC-shaped pulses.

All waveforms has

- a) a pre-ambble, where the phase is stepped 90 degree per symbol (75 baud rate),
- b) followed by a number of cycles 000/001/010/011/100/....

Since I have provided the baseband waveforms, here are the carrier tones that I used:

Waveform 1: 1350 Hz	( single channel	DQPSK)
2: 1350/1500 Hz	( dual channel	DQPSK)
3: 1350/1500/1650/1800	( quad channel	DQPSK -- QUATOR)

As you may notice form above, the tones are spaced at 2\*Baudrate and there are eight phases on each carrier tone.

I would suggest you start off with the single channel waveform, extract and study the I/Q waveform relationship, especially the pre-ambble which will reveal a lot.

For folks attending the DCC next week; a brief overview of QUATOR is planned for the HFSIG meeting. I'll show some ideas of how the bit assembly is to be done for achieving the time/frequency diversity. Keep in mind that things are experimental and things are wide open for suggestions/critisism. This is your opportunity to bring your ideas for further discussion.

As far as the actual implementation, at least what I am doing; I have been using the PSA sound card platform thus far. This seems to have worked out exteremely well for coding various parts of the modem, i.e., for monitoring the workings of things like Costas loops and bit sync algorithms.

For the future, however, I'm not sure which way I'll go. My experience with the new TI 320C31 DSK has been very encouraging - perhaps too little memory, but it is really nice for the task, the speed and dynamic range, and a high speed connection with the PC. This would make an ideal free-standing implementation. On the other hand, I'm tempted to develop on the PC using the soundblaster, but that would have no chance of ever getting the the ARQ mode to work. I will, however, be able to play with the broadcast and CSMA modes.

I'll need to see how things develop - too much going on at the moment and the new modem have been on the shelf due to that. Would be nice to resume experimental work again.

Much rambling, but hope this helps,

--Johan

From karn@qualcomm.com Tue Sep 10 18:03:54 1996

Received: from servo.qualcomm.com (servo.qualcomm.com [129.46.101.170]) by tapr.org (8.7.5/8.7.3/1.9) with ESMTP id SAA18220 for <hfsig@tapr.org>; Tue, 10

Sep 1996 18:03:52 -0500 (CDT)  
Received: (from karn@localhost) by servo.qualcomm.com (8.7.5/1.0/8.7.2/1.9) id QAA07499; Tue, 10 Sep 1996 16:03:20 -0700 (PDT)  
Date: Tue, 10 Sep 1996 16:03:20 -0700 (PDT)  
From: Phil Karn <karn@qualcomm.com>  
Message-Id: <199609102303.QAA07499@servo.qualcomm.com>  
To: hfsig@tapr.org  
Subject: coding progress

Hello all,

I've been rather quiet here of late so I thought I'd mention what I've been doing in my spare time over the past couple of weeks.

I've continued to fine-tune my Viterbi decoder for speed and  $E_b/N_0$  performance.

My previous version uses the "register exchange" method to update the path histories. This limited the path history to 32 bits, the size of a long integer in C. This is barely adequate as the rule-of-thumb says that the path history should be at least 4-5 times the constraint length ( $K=7$ ), longer if the code is going to be punctured to high rates.

I rewrote my current version to use the traceback method. In this case, the path histories are saved all the way from the beginning of the packet. At the end of the packet, I "trace back" through the path memory to determine the decoded data. Although this version is packet-oriented at present, it shouldn't be too hard to modify to operate in a continuous stream mode where traceback is done every  $N$  bits ( $N \gg K$ ).

I've also spent quite a bit of effort tuning up the Viterbi decoder for speed. Through a few more C coding tricks, I now have it running at 258 kb/s on a 133 MHz Pentium. (The compiler is GCC 2.7.2 with full optimization).

Thanks to my success with fast Viterbi decoding I've gotten more interested of late in concatenated Reed-Solomon/Viterbi coding. These codes were used on the Voyager mission starting at Uranus, and they are now an integral part of digital satellite broadcasting (European DVB, US DSS).

In terms of  $E_b/N_0$  they perform about as well as sequential decoding but with more uniform computational effort. The BER curve for the Voyager code is a nearly vertical wall at a  $E_b/N_0$  of about 2.5 dB. The Voyager outer code is a (255,223) RS code over  $GF(256)$ , and the inner code is a rate 1/2  $K=7$  Viterbi-decoded convolutional code. DVB uses a shortened (204,188) RS outer code and a  $K=7$  Viterbi inner code at various rates from 1/2 to 7/8, so it's not quite as strong as the Voyager code but is still quite good.

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I'll put both my new Viterbi decoder and the RS stuff up on my web page in a few days when I package it up.

Phil

From wb4gcs@amsat.org Tue Sep 10 19:34:25 1996  
Received: from mh004.infi.net (mh004.infi.net [198.22.1.119]) by tapr.org (8.7.5/8.7.3/1.9) with ESMTP id TAA22911 for <hfsig@tapr.org>; Tue, 10 Sep 1996 19:34:21 -0500 (CDT)  
Received: from PENTIUM by mh004.infi.net with SMTP  
(Infinet-S-3.3) id UAA28238; Tue, 10 Sep 1996 20:34:12 -0400 (EDT)  
Message-Id: <1.5.4.32.19960911003350.8c5091dc@infi.net>  
X-Sender: jsanford@infi.net  
X-Mailer: Windows Eudora Light Version 1.5.4 (32)  
Mime-Version: 1.0  
Content-Type: text/plain; charset="us-ascii"  
Date: Tue, 10 Sep 1996 20:33:50 -0400  
To: hfsig@tapr.org  
From: Jim Sanford <wb4gcs@amsat.org>  
Subject: Re: [HFSIG:1525] Re: Johan's modem

At 11:28 AM 9/10/96 -0500, you wrote:

>>Hi,

>>

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>>load them into matlab, and I can see the 4 modulated tones, and I can  
>>see amplitude and phase modulation on each one, but I cannot extract any  
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>used:  
>  
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>            2: 1350/1500 Hz            ( dual     channel   DQPSK)  
>            3: 1350/1500/1650/1800   ( quad     channel   DQPSK -- QUATOR)  
>  
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>  
>--Johan  
>  
>

Johan:  
PLEASE stay with the PSA chip set . . . . .  
73, Jim  
wb4gcs@amsat.org  
>

From forrerj@peak.org Tue Sep 10 21:32:43 1996  
Received: from PEAK.ORG (root@PEAK.ORG [198.68.22.17]) by tapr.org  
(8.7.5/8.7.3/1.9) with SMTP id VAA27161 for <hfsig@tapr.org>; Tue, 10 Sep 1996  
21:32:40 -0500 (CDT)  
Received: from p05.t0.monrotel.com (p04.t0.monrotel.com [198.68.25.37]) by  
PEAK.ORG (8.6.13/8.6.7) with SMTP id TAA27279 for <hfsig@tapr.org>; Tue, 10 Sep  
1996 19:32:44 -0700  
Message-Id: <199609110232.TAA27279@PEAK.ORG>  
X-Sender: forrerj@peak.org (Unverified)  
X-Mailer: Windows Eudora Version 1.4.4  
Mime-Version: 1.0  
Content-Type: text/plain; charset="us-ascii"  
Date: Tue, 10 Sep 1996 19:26:30 -0800  
To: hfsig@tapr.org  
From: forrerj@peak.org (Johan Forrer)  
Subject: Re: [HFSIG:1526] coding progress

Phil,

Nice progress - I am looking forward to downloading the latest versions of  
the decoders.

A bit of feedback if you're interested - I have had a bash at converting the  
Fano decoder to run under MS VC++ version 4.0. This is for the NT/WIN95  
32-bit platform. I found that there are a number of routines that are common  
UNIX or GCC, but are missing from the MS libraries. I'll post something  
about this, but perhaps see your latest version first.

Keep up the good work!

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>  
>Phil  
>  
>

From edu@kender.es Wed Sep 11 13:39:22 1996

Received: from kender.es (kender.es [194.179.91.10]) by tapr.org (8.7.5/8.7.3/1.9)  
with ESMTP id NAA08124 for <hfsig@tapr.org>; Wed, 11 Sep 1996 13:38:55 -0500 (CDT)  
Received: from tximbo.kender.es (p4.kender.es [194.179.91.53]) by kender.es  
(8.7.5/8.7.3) with SMTP id UAA13498 for <hfsig@tapr.org>; Wed, 11 Sep 1996  
20:33:53 +0200

Message-Id: <1.5.4.32.19960911213841.0067b2b4@kender.es>

X-Sender: edu@kender.es (Unverified)

X-Mailer: Windows Eudora Light Version 1.5.4 (32)

Mime-Version: 1.0

Content-Type: text/plain; charset="us-ascii"  
Date: Wed, 11 Sep 1996 20:38:41 -0100  
To: hfsig@tapr.org  
From: Eduardo Jacob <edu@kender.es>  
Subject: Re: coding progress

>A bit of feedback if you're interested - I have had a bash at converting the  
>Fano decoder to run under MS VC++ version 4.0. This is for the NT/WIN95  
>32-bit platform. I found that there are a number of routines that are common  
>UNIX or GCC, but are missing from the MS libraries. I'll post something  
>about this, but perhaps see your latest version first.

I have read in DDJ that there is a port of GNU-C to Windows'95,  
perhaps you could use it. I don't remember very well but I think the missing  
parts were those related to the GUI. For dos perhaps DDJ could suit you.

Eduardo EA2BAJ  
Eduardo, EA2BAJ

From karn@qualcomm.com Wed Sep 11 17:41:33 1996  
Received: from servo.qualcomm.com (servo.qualcomm.com [129.46.101.170]) by  
tapr.org (8.7.5/8.7.3/1.9) with ESMTP id RAA18624 for <hfsig@tapr.org>; Wed, 11  
Sep 1996 17:41:31 -0500 (CDT)  
Received: (from karn@localhost) by servo.qualcomm.com (8.7.5/1.0/8.7.2/1.9) id  
PAA18109; Wed, 11 Sep 1996 15:40:58 -0700 (PDT)  
Date: Wed, 11 Sep 1996 15:40:58 -0700 (PDT)  
From: Phil Karn <karn@qualcomm.com>  
Message-Id: <199609112240.PAA18109@servo.qualcomm.com>  
To: hfsig@tapr.org  
In-reply-to: <1.5.4.32.19960911213841.0067b2b4@kender.es> (message from Eduardo  
Jacob on Wed, 11 Sep 1996 13:48:17 -0500 (CDT))  
Subject: Re: [HFSIG:1529] Re: coding progress

>>A bit of feedback if you're interested - I have had a bash at converting the  
>>Fano decoder to run under MS VC++ version 4.0. This is for the NT/WIN95  
>>32-bit platform. I found that there are a number of routines that are common  
>>UNIX or GCC, but are missing from the MS libraries. I'll post something  
>>about this, but perhaps see your latest version first.

I'm a little confused by this, as the Fano decoder is just a low level  
subroutine that doesn't make use of anything elaborate in the  
operating environment. It should port to just about any C environment.

> I have read in DDJ that there is a port of GNU-C to Windows'95,  
>perhaps you could use it. I don't remember very well but I think the missing  
>parts were those related to the GUI. For dos perhaps DDJ could suit you.

There is a port of GNU-C to DOS called DJGPP that I'm pretty familiar with.  
A few weeks ago I released a port of KA9Q NOS to DJGPP; it's up on my web  
page. Are you saying there is specific support for windows 95 in graphics  
(not dos) mode?

Phil

From forrerj@peak.org Thu Sep 12 01:36:40 1996  
Received: from PEAK.ORG (root@PEAK.ORG [198.68.22.17]) by tapr.org  
(8.7.5/8.7.3/1.9) with SMTP id BAA12248 for <hfsig@tapr.org>; Thu, 12 Sep 1996  
01:36:38 -0500 (CDT)  
Received: from p01.t0.monrotel.com (p01.t0.monrotel.com [198.68.25.34]) by  
PEAK.ORG (8.6.13/8.6.7) with SMTP id XAA12565 for <hfsig@tapr.org>; Wed, 11 Sep  
1996 23:36:45 -0700  
Message-Id: <199609120636.XAA12565@PEAK.ORG>  
X-Sender: forrerj@peak.org (Unverified)  
X-Mailer: Windows Eudora Version 1.4.4  
Mime-Version: 1.0  
Content-Type: text/plain; charset="us-ascii"  
Date: Wed, 11 Sep 1996 23:30:28 -0800  
To: hfsig@tapr.org  
From: forrerj@peak.org (Johan Forrer)  
Subject: Re: [HFSIG:1530] Re: coding progress

Hi Phil,

Here are more specifics that may help;

>>>A bit of feedback if you're interested - I have had a bash at converting the  
>>>Fano decoder to run under MS VC++ version 4.0. This is for the NT/WIN95  
>>>32-bit platform. I found that there are a number of routines that are common  
>>>UNIX or GCC, but are missing from the MS libraries. I'll post something  
>>>about this, but perhaps see your latest version first.

>

>I'm a little confused by this, as the Fano decoder is just a low level  
>subroutine that doesn't make use of anything elaborate in the  
>operating environment. It should port to just about any C environment.

>

I'm using VC version 4.0 (4.2 is the latest):

Metrics.c: erf() .... not recognized perhaps there is an equivalent.

M\_SQRT2, M\_LOG2E .... not recognized - these are UNIX/GCC natives.

Sim.c: random() ... doesn't recognize this either.

Of course, curses doesn't exist, but one can work around that. Otherwise  
the function you use to parse your command-line arguments also doesn't have  
an equivalent. There are a few minor picky warnings regarding type casting  
that I agree with the compiler, but won't hurt.

>> I have read in DDJ that there is a port of GNU-C to Windows'95,  
>>perhaps you could use it. I don't remember very well but I think the missing  
>>parts were those related to the GUI. For dos perhaps DDJ could suit you.

>

>There is a port of GNU-C to DOS called DJGPP that I'm pretty familiar with.

Yes - the makefile for the Fano decoder and test programs all compile/link and execute 100% with DJGPP - either under DOS or a DOS box under WIN95.

>A few weeks ago I released a port of KA9Q NOS to DJGPP; it's up on my web  
>page. Are you saying there is specific support for windows 95 in graphics  
>(not dos) mode?

>  
>Phil  
>  
>

I suspect he might be referring to that it is for generating Win95 "console" mode code, i.e., 32-bit programs that run in a Win95 DOS box. These do not use the Windows GUI functions.

DJGPP is very slick and I like it a lot. My main objection with DJGPP, however, is when one venture into doing hardware access, which is what we used to do with DOS programs - DJGPP does that with with nasty old DPMI calls that I really discourage anyone to use. I personally feel that I would want to move away from DOS and things like DOS extenders and the limitations of 64K segments. The right way, in my humble opinion, is to bite the bullet and write your own VxDs to do that kind of thing using the native mechanisms provided by the operating system. This way one can control and guarantee interrupt latency and control the flow of data/control between Win95-based programs and real-time, low-level, device dependant code. Not that I think Win95 is all that great a piece of code, but I suspect that any code that will run under that platform will enjoy that much greater appeal in the ham community and get folks interested. If that was'nt the case, I would prefer to do all my work under Linux (my two-cents worth).

--Johan

From jmorriso@bogomips.com Thu Sep 12 02:20:42 1996  
Received: from orange.ConcordPacific.Com (root@orange.ConcordPacific.com [204.239.26.10]) by tapr.org (8.7.5/8.7.3/1.9) with SMTP id CAA13155 for <hfsig@tapr.org>; Thu, 12 Sep 1996 02:20:39 -0500 (CDT)  
Received: from bogomips.com (root@jmorriso.muliactive.com [204.239.26.200]) by orange.ConcordPacific.Com (8.6.12/8.6.12) with SMTP id AAA20114 for <hfsig@tapr.org>; Thu, 12 Sep 1996 00:20:59 -0700  
Received: by bogomips.com (Linux Smail3.1.29.1 #3) id m0v162e-000TyBC; Thu, 12 Sep 96 00:18 PDT  
Message-Id: <m0v162e-000TyBC@bogomips.com>  
From: jmorriso@bogomips.com (John Paul Morrison)  
Subject: Re: [HFSIG:1530] Re: coding progress  
To: hfsig@tapr.org  
Date: Thu, 12 Sep 1996 00:18:28 -0700 (PDT)  
In-Reply-To: <199609112240.PAA18109@servo.qualcomm.com> from "Phil Karn" at Sep 11, 96 05:55:46 pm  
X-Bogomips: 33.55  
Content-Type: text

>  
> I'm a little confused by this, as the Fano decoder is just a low level  
> subroutine that doesn't make use of anything elaborate in the  
> operating environment. It should port to just about any C environment.  
>  
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> A few weeks ago I released a port of KA9Q NOS to DJGPP; it's up on my web  
> page. Are you saying there is specific support for windows 95 in graphics  
> (not dos) mode?

Cygnus support sponsored a port to Windows NT, plus compatibility  
libraries to make UNIX programs easy to port. Windows 95 implements  
some of the Windows NT (Win32) API, so it runs under that too  
(but not as well apparently).

I think it can only do console mode (ie text), more code needs  
to be written so GCC can create GUI apps.

>  
> Phil  
>  
>

-----  
BogoMIPS Research Labs -- bogosity research & simulation -- VE7JPM --  
jmorriso@bogomips.com ve7jpm@ve7jpm.ampr.org jmorriso@ve7ubc.ampr.org  
-----

From jtpjatae@bicc00.bi.ehu.es Thu Sep 12 05:47:31 1996  
Received: from bicc00.bi.ehu.es (bicc00.bi.ehu.es [158.227.65.40]) by tapr.org  
(8.7.5/8.7.3/1.9) with SMTP id FAA18245 for <hfsig@tapr.org>; Thu, 12 Sep 1996  
05:47:24 -0500 (CDT)  
Received: from bipt71.bi.ehu.es by bicc00.bi.ehu.es (AIX 3.2/UCB 5.64/4.03)  
id AA21376; Thu, 12 Sep 1996 12:49:14 +0100  
Message-Id: <9609121149.AA21376@bicc00.bi.ehu.es>  
Comments: Authenticated sender is <jtpjatae@bicc00.bi.ehu.es>  
From: "Eduardo Jacob" <jtpjatae@bicc00.bi.ehu.es>  
Organization: ETSII y de IT, Bilbao, UPV/EHU  
To: hfsig@tapr.org  
Date: Thu, 12 Sep 1996 12:47:06 +0000  
Subject: Re: coding progress  
Reply-To: jtpjatae@bicc00.bi.ehu.es  
Priority: normal  
X-Mailer: Pegasus Mail for Win32 (v2.42a)

> > I have read in DDJ that there is a port of GNU-C to Windows'95,  
> >perhaps you could use it. I don't remember very well but I think the missing  
> >parts were those related to the GUI. For dos perhaps DDJ could suit you.  
>

> There is a port of GNU-C to DOS called DJGPP that I'm pretty familiar with.  
> A few weeks ago I released a port of KA9Q NOS to DJGPP; it's up on my web  
> page. Are you saying there is specific support for windows 95 in graphics  
> (not dos) mode?

For DOS I was speaking about DJGPP, not DDJ. Yes, the objective is to be able to build full GUI programs on Windows95 and NT. But I think it is not totally working. They are on Beta 16 There is information in

<ftp://ftp.cygnum.com/pub/sac/gnuwin32>

I have read it in DrDobbs Journal pages 121-126.

Eduardo EA2BAJ

Eduardo Jacob - Area de Ingenieria Telematica  
Departamento de Electronica y Telecomunicaciones  
ETSII y de IT Tel: +34-(9)4-427 8055  
UPV / EHU Fax: +34-(9)4-441 4041  
Alda Urquijo s/n E-mail: jtpjatae@bi.ehu.es  
E-48013 - Bilbao (Spain) : 100021,2212 Compuserve

From rwmcgwier@worldnet.att.net Thu Sep 12 07:00:36 1996  
Received: from mtigwc02.worldnet.att.net (mailhost.worldnet.att.net [204.127.129.4]) by tapr.org (8.7.5/8.7.3/1.9) with ESMTP id HAA20169 for <hfsig@tapr.org>; Thu, 12 Sep 1996 07:00:33 -0500 (CDT)  
Received: from dad.ccr-p.ida.org ([207.146.141.132])  
by mtigwc02.worldnet.att.net (post.office MTA v2.0 0613 )  
with SMTP id AAA20415 for <hfsig@tapr.org>;  
Thu, 12 Sep 1996 12:00:00 +0000

Message-ID: <3237FA46.2C96@worldnet.att.net>  
Date: Thu, 12 Sep 1996 07:55:50 -0400  
From: Robert McGwier <rwmcgwier@worldnet.att.net>  
Reply-To: rwmcgwier@worldnet.att.net  
Organization: N4HY Software  
X-Mailer: Mozilla 3.0b8Gold (Win95; I)  
MIME-Version: 1.0  
To: hfsig@tapr.org  
Subject: Re: [HFSIG:1526] coding progress  
References: <199609102303.QAA07499@servo.qualcomm.com>  
Content-Type: text/plain; charset=us-ascii  
Content-Transfer-Encoding: 7bit

Phil Karn wrote:

>  
> Hello all,  
>  
> I've been rather quiet here of late so I thought I'd mention what I've  
> been doing in my spare time over the past couple of weeks.  
>  
> I've continued to fine-tune my Viterbi decoder for speed and Eb/N0  
> performance.  
>

I saw a brilliant talk by Bob McEliece yesterday at the retirement bash for Neal Zierler. It was on Turbo Codes. I have a good understanding of what they are about now, maybe even better than McEliece ;-). He has built an intuitive understanding of WHY they work but cannot prove it. It is closely enough related to some stuff that I have done that I believe I CAN prove why they work and I have some techniques at my disposal that will allow me to accelerate their convergence. He claims that Viterbi claims they are the most significant development in N years (where N closely matches the number of years since he developed the Viterbi decoder). You and I have had a conversation before on the telephone where I told the win of a posteriori estimation over dynamic programming based estimation. Let me reemphasize it here since it is at the very heart of Turbo codes. Dynamic programming (Viterbi decoding) finds the best PATH through the possible paths of symbols. What you want is to minimize the probability of making an error at each decision time given all the available evidence. It is this that Hidden Markov Models do (where the symbol is the Markov chain and the noisy channel is providing the Hidden ;-). Turbo codes have at their heart, HMM, and the decoder approximates the EM algorithm (which was first developed here at my company and the first rigorous proofs concerning it were made by Baum, Petrie, Soules, and Welch while working here). My experiments show that Turbo codes get <<<<< within 1 dB of the Shannon limit and indeed get in a case I have tried to -0.6 dB Eb/N0 >>>>>. You must climb onto the power curve on this it IS the future of coding. I posted this to everyone since you appear to be ham radio's primary instructor on coding these days and everyone could benefit by discussions.

Bob

```

*****
* Robert W. McGwier, Ph.D. * Mathematician. Hobbies: Computers,
Astronomy*
* 64 Brooktree Rd.           * Amateur Radio. Scouts: Council Commissioner
*
* East Windsor, NJ 08520    * Post 995 Advisor, Troop 5700 Advancement,
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* (H) 609-443-8963          * Sanhican #2 (Brotherhood), Used to be a
*
* (F) 609-924-3061          * Buffalo (NE-III-120). George Washington
*
* (W) 609-279-6240          * Council. Brownie Troop 193
*
*****

```

From karn@qualcomm.com Thu Sep 12 13:23:12 1996  
Received: from servo.qualcomm.com (servo.qualcomm.com [129.46.101.170]) by tapr.org (8.7.5/8.7.3/1.9) with ESMTP id NAA05011 for <hfsig@tapr.org>; Thu, 12 Sep 1996 13:23:10 -0500 (CDT)  
Received: (from karn@localhost) by servo.qualcomm.com (8.7.5/1.0/8.7.2/1.9) id LAA28123; Thu, 12 Sep 1996 11:22:38 -0700 (PDT)  
Date: Thu, 12 Sep 1996 11:22:38 -0700 (PDT)  
From: Phil Karn <karn@qualcomm.com>  
Message-Id: <199609121822.LAA28123@servo.qualcomm.com>  
To: hfsig@tapr.org  
In-reply-to: <199609120636.XAA12565@PEAK.ORG> (forrerj@peak.org)  
Subject: Re: [HFSIG:1531] Re: coding progress

>Metrics.c: erf() .... not recognized perhaps there is an equivalent.  
>  
> M\_SQRT2, M\_LOG2E .... not recognized - these are UNIX/GCC natives.  
  
>Sim.c: random() ... doesn't recognize this either.

Ah, those are both support files, not the actual decoder...

erf() is in the UNIX math library, and should be in most PC subroutine libraries. It's the gaussian error function and is used to build the metric tables from "first principles", i.e., from a knowledge of the channel transition probabilities that are a function of  $E_b/N_0$  and amplitude.

M\_SQRT2 and M\_LOG2E are constants usually defined in <math.h>. M\_SQRT2 is  $\sqrt{2}$  and M\_LOG2E is  $\log_2(e)$ .

random() is a random number generator returning a value between 0 and 0x7fffffff inclusive. It's used to generate random bits and gaussian noise for test purposes.

I note that the metric table can be built "offline" e.g., on a UNIX system or under DJGPP with a math package and then the table(s) included as compile-time data in the final program. Although the Fano decoder works best when you compute a metric table for the actual  $E_b/N_0$ , I've found experimentally that you can use a fixed table computed for the worst  $E_b/N_0$  you can handle (the computational cutoff rate, about 2.5 dB for rate 1/2) and then scale the incoming signal to maintain the constant noise level used to build the metric table. Much stronger signals will saturate the soft-decision samples and effectively degrade the decoder to hard decision decoding, but if they're that strong and clean in the first place that won't hurt anything. And signals noisier than 2.5 dB, of course, won't decode anyway.

In other words, don't worry about the signal amplitude, it's the noise amplitude that counts.

That's because the most important thing with the fano decoder is that the branch metrics on the correct path be generally positive. If the



signal level is too low for the metric table in use, then the decoder will constantly back up thinking it has made an error when in fact it's on the best path. That's why it's important to scale the incoming signal to attempt to keep the noise level constant. That also explains why a signal AGC is a \*very bad\* idea in Fano decoding, if it causes the noise level to vary. You want to keep the noise level constant and let the signal level vary if it has to. Again, let the signal saturate if it gets strong, that won't hurt anything.

One of the big advantages of the Viterbi decoder over the Fano decoder, btw, is that the Viterbi decoder works for just about any metric table, as long as it's not "upside down", i.e., as long as it's matched to the signal polarity. Even the set of integers 0-255 seems to work well. As long as the signal amplitude is such as to use at least a few bits of your sample dynamic range, the algorithm will function reasonably optimally.

Phil

From karn@qualcomm.com Thu Sep 12 13:25:25 1996  
Received: from servo.qualcomm.com (servo.qualcomm.com [129.46.101.170]) by tapr.org (8.7.5/8.7.3/1.9) with ESMTP id NAA05063 for <hfsig@tapr.org>; Thu, 12 Sep 1996 13:25:23 -0500 (CDT)  
Received: (from karn@localhost) by servo.qualcomm.com (8.7.5/1.0/8.7.2/1.9) id LAA28126; Thu, 12 Sep 1996 11:24:51 -0700 (PDT)  
Date: Thu, 12 Sep 1996 11:24:51 -0700 (PDT)  
From: Phil Karn <karn@qualcomm.com>  
Message-Id: <199609121824.LAA28126@servo.qualcomm.com>  
To: hfsig@tapr.org  
In-reply-to: <m0v162e-000TyBC@bogomips.com> (jmorriso@bogomips.com)  
Subject: Re: [HFSIG:1532] Re: coding progress

Thanks for the info on GCC under windows. Of course, the question remains: is it possible to write anything approaching "real time" code under that system, as opposed to running under DOS on a bare machine? You can alleviate the problem with buffering (e.g., on a sound card). But I've already seen at least one machine running W95 (my laptop) that stutters occasionally like Max Headroom when playing back audio, probably because of missed interrupts. It never did that under W 3.1.

Phil

From karn@qualcomm.com Thu Sep 12 13:29:57 1996  
Received: from servo.qualcomm.com (servo.qualcomm.com [129.46.101.170]) by tapr.org (8.7.5/8.7.3/1.9) with ESMTP id NAA05200 for <hfsig@tapr.org>; Thu, 12 Sep 1996 13:29:54 -0500 (CDT)  
Received: (from karn@localhost) by servo.qualcomm.com (8.7.5/1.0/8.7.2/1.9) id LAA28130; Thu, 12 Sep 1996 11:29:23 -0700 (PDT)  
Date: Thu, 12 Sep 1996 11:29:23 -0700 (PDT)

From: Phil Karn <karn@qualcomm.com>  
Message-Id: <199609121829.LAA28130@servo.qualcomm.com>  
To: hfsig@tapr.org  
In-reply-to: <3237FA46.2C96@worldnet.att.net> (message from Robert McGwier on Thu, 12 Sep 1996 07:13:33 -0500 (CDT))  
Subject: Re: [HFSIG:1534] Re: coding progress

I agree, turbo codes are very exciting and they probably represent coding's last gasp. I've heard both Viterbi and McEliece speak at Qualcomm on this subject.

But there's a catch. Patents are flying in this area faster than bullets in a battlefield, and since I'm interested in writing free software the last thing I want is to be sued. Fano decoders, Viterbi decoders, Reed-Solomon decoders and concatenated codes have been around for 25-35 years and are clearly in the public domain.

Phil

From forrerj@peak.org Thu Sep 12 16:16:56 1996  
Received: from PEAK.ORG (root@PEAK.ORG [198.68.22.17]) by tapr.org (8.7.5/8.7.3/1.9) with SMTP id QAA12990 for <hfsig@tapr.org>; Thu, 12 Sep 1996 16:16:52 -0500 (CDT)  
Received: from p06.t0.monroterel.com (p06.t0.monroterel.com [198.68.25.39]) by PEAK.ORG (8.6.13/8.6.7) with SMTP id OAA18381 for <hfsig@tapr.org>; Thu, 12 Sep 1996 14:17:00 -0700  
Message-Id: <199609122117.OAA18381@PEAK.ORG>  
X-Sender: forrerj@peak.org  
X-Mailer: Windows Eudora Version 1.4.4  
Mime-Version: 1.0  
Content-Type: text/plain; charset="us-ascii"  
Date: Thu, 12 Sep 1996 14:10:55 -0800  
To: hfsig@tapr.org  
From: forrerj@peak.org (Johan Forrer)  
Subject: Re: [HFSIG:1532] Re: coding progress

John,

I checked this out and looks like an interesting development - they are at Beta 16, but still is a cross-port running on a Linux platform. The native compiler for the Win95 platform is still in it's infancy - will be a while if I interpret things correctly.

>> There is a port of GNU-C to DOS called DJGPP that I'm pretty familiar with.  
>> A few weeks ago I released a port of KA9Q NOS to DJGPP; it's up on my web  
>> page. Are you saying there is specific support for windows 95 in graphics  
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>(but not as well apparently).

>

>I think it can only do console mode (ie text), more code needs

>to be written so GCC can create GUI apps.

>

>>

>> Phil

>>

>>

>

>-----

>BogoMIPS Research Labs -- bogosity research & simulation -- VE7JPM --

> jmorriso@bogomips.com ve7jpm@ve7jpm.ampr.org jmorriso@ve7ubc.ampr.org

>-----

>

>

--Johan

From jmorriso@bogomips.com Thu Sep 12 23:29:31 1996

Received: from orange.ConcordPacific.Com (root@orange.ConcordPacific.com

[204.239.26.10]) by tapr.org (8.7.5/8.7.3/1.9) with SMTP id XAA10218 for

<hfsig@tapr.org>; Thu, 12 Sep 1996 23:29:28 -0500 (CDT)

Received: from bogomips.com (root@jmorriso.multiactive.com [204.239.26.200]) by

orange.ConcordPacific.Com (8.6.12/8.6.12) with SMTP id VAA18942 for

<hfsig@tapr.org>; Thu, 12 Sep 1996 21:29:47 -0700

Received: by bogomips.com (Linux Smail3.1.29.1 #3)

id m0v1Pq1-000TswC; Thu, 12 Sep 96 21:27 PDT

Message-Id: <m0v1Pq1-000TswC@bogomips.com>

From: jmorriso@bogomips.com (John Paul Morrison)

Subject: Re: [HFSIG:1538] Re: coding progress

To: hfsig@tapr.org

Date: Thu, 12 Sep 1996 21:27:29 -0700 (PDT)

In-Reply-To: <199609122117.0AA18381@PEAK.ORG> from "Johan Forrer" at Sep 12, 96  
04:33:23 pm

X-Bogomips: 33.55

Content-Type: text

>

> John,

>

>

> I checked this out and looks like an interesting development - they are at

> Beta 16, but still is a cross-port running on a Linux platform. The native

> compiler for the Win95 platform is still in it's infancy - will be a while

> if I interpret things correctly.

>

> --Johan

GCC is not yet self-hosting on Win95/WinNT (ie can recompile itself)  
but it does compile programs (actually, I think it will build itself  
with some manual assistance). Also, I don't think Windows 95 is the  
primary goal of the Win32 port. It's meant to work with Windows NT;

the Windows 95 support is a secondary bonus because it supports some of the Win32 api, but not others.

Depending on what you want to do, DJGPP programs work in Windows 95. I was able to run the DJGPP version of NOS (which I cross-compiled in Linux) in Windows 95, and use SLIP. Packet drivers should work too.

>  
>

-----  
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jmorriso@bogomips.com ve7jpm@ve7jpm.ampr.org jmorriso@ve7ubc.ampr.org  
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From sailer@ife.ee.ethz.ch Fri Sep 13 09:34:46 1996  
Received: from ife.ee.ethz.ch (ife-ife2.ee.ethz.ch [129.132.25.129]) by tapr.org (8.7.5/8.7.3/1.9) with ESMTP id JAA03507 for <hfsig@tapr.org>; Fri, 13 Sep 1996 09:34:36 -0500 (CDT)  
Received: from eldrich.ee.ethz.ch (eldrich.ee.ethz.ch [129.132.25.145]) by ife.ee.ethz.ch (8.7.5/8.7.5) with SMTP id QAA02316 for <hfsig@tapr.org>; Fri, 13 Sep 1996 16:34:31 +0200 (MET DST)  
Sender: sailer@ife.ee.ethz.ch  
Message-ID: <323970F5.35E5@ife.ee.ethz.ch>  
Date: Fri, 13 Sep 1996 16:34:29 +0200  
From: Thomas Sailer <sailer@ife.ee.ethz.ch>  
Organization: IfE  
X-Mailer: Mozilla 3.0 (X11; I; SunOS 5.5 sun4m)  
MIME-Version: 1.0  
To: hfsig@tapr.org  
Subject: Re: [HFSIG:1536] Re: coding progress  
References: <199609121824.LAA28126@servo.qualcomm.com>  
Content-Type: text/plain; charset=us-ascii  
Content-Transfer-Encoding: 7bit

> card). But I've already seen at least one machine running W95 (my  
> laptop) that stutters occasionally like Max Headroom when playing back  
> audio, probably because of missed interrupts. It never did that under  
> W 3.1.

This seems to be a different problem. We're currently working on Windows support for PC/FlexNet, and Baycom type modems and (U)SCC cards at higher speeds run already, which have rather hard requirements wrt interrupt latency.  
Not that I am a Windoze advocat...

Tom

From forrerj@peak.org Mon Sep 23 10:49:48 1996  
Received: from PEAK.ORG (root@PEAK.ORG [198.68.22.17]) by tapr.org (8.7.5/8.7.3/1.9) with SMTP id KAA20613 for <HFSIG@TAPR.org>; Mon, 23 Sep 1996 10:49:47 -0500 (CDT)  
Received: from p03.t0.monrotel.com (p00.t0.monrotel.com [198.68.25.33]) by PEAK.ORG (8.6.13/8.6.7) with SMTP id IAA27272 for <HFSIG@TAPR.org>; Mon, 23 Sep

1996 08:49:58 -0700  
Message-Id: <199609231549.IAA27272@PEAK.ORG>  
X-Sender: forrerj@peak.org  
X-Mailer: Windows Eudora Version 1.4.4  
Mime-Version: 1.0  
Content-Type: text/plain; charset="us-ascii"  
Date: Mon, 23 Sep 1996 08:45:26 -0800  
To: HFSIG@tapr.org  
From: forrerj@peak.org (Johan Forrer)  
Subject: DCC 1996

Hi All,

I will shortly post a short summary of my impressions of the recent DCC.

First; let me thank the hosts; BEARS (Boeing Employees Amateur Radio Society) for all the kind and generous hospitality. The conference venue was excellent, food great, and we were kept entertained and happy.

I also wish to thank ARRL and the folks from TAPR for all the hard work that have gone into making such an event successful. Just to illustrate; the proceedings consists of some 256 double-sided pages with excellent technical content, for example, two outstanding contributions on 1.2 Mbit/s digital transceivers by Matjaz Vidmar, S53MV - complete with schematics.

The interest in HF digital was heartwarming and so was the HFSIG meeting (at least from where I was standing on the other side of the podium!) The topic this time was woven around past discussions we have had on HFSIG regarding HF Channel simulation: Tom McDermot did an excellent presentation of the mechnics involved in simulation using the Watterson model, that I followed with showing a number of "doppler grams", courtesy of Peter Martinez, G3PLX. These are really unique and worth seeing. A brief overview of software for the DSP-93 and a demo running this implementation of the Watterson ionospheric model, concluded this part of the meeting. I also presented an outline of the work that I have been doing on QUATOR.

More to follow later on the DCC.

I also need to prepare a posting on some of the recent developments on the slow-speed BPSK scene - this involves some innovative coding that are especially suited for such narrow-band systems that are limited by human typing speeds - quite contrary to the trend to building error-correcting codes.

73's till later.

--Johan Forrer, KC7WW

From forrerj@peak.org Tue Sep 24 10:50:07 1996  
Received: from PEAK.ORG (root@PEAK.ORG [198.68.22.17]) by tapr.org  
(8.7.5/8.7.3/1.9) with SMTP id KAA04954 for <HFSIG@TAPR.ORG>; Tue, 24 Sep 1996  
10:50:05 -0500 (CDT)  
Received: from p06.t0.monrotel.com (p06.t0.monrotel.com [198.68.25.39]) by

PEAK.ORG (8.6.13/8.6.7) with SMTP id IAA09227 for <HFSIG@TAPR.ORG>; Tue, 24 Sep 1996 08:50:03 -0700

Message-Id: <199609241550.IAA09227@PEAK.ORG>

X-Sender: forrerj@peak.org

X-Mailer: Windows Eudora Version 1.4.4

Mime-Version: 1.0

Content-Type: text/plain; charset="us-ascii"

Date: Tue, 24 Sep 1996 08:45:42 -0800

To: HFSIG@tapr.org

From: forrerj@peak.org (Johan Forrer)

Subject: G3PLX's Dopplergrams

Hi,

I have had someone ask to post further details about how the dopplergrams that I showed at the DCC were produced.

Actually it's an old trick used in monitoring meteor scatter and other weak signals; monitor a known transmission that you know arrives via the ionosphere.

Peter's examples were recorded on 21 MHz, 17.7 MHz, 10.2 MHz, 7.7 MHz, and 3.5 MHz. Then a slice of the receiver's audio passband, say around 1 kHz are converted into a stream of I/Q values at 10 mS intervals and that run through an FFT to produce the images. Peter then describes the display as follow:

"These images are time/frequency plots, with signal-level encoded as the brightness. They were originally 16-level, and the signal level is logarithmic with 3.75dB per grey-step, so that the full dynamic range is 60dB. In the vertical direction there are 256 pixels representing the frequency axis, and in most of the images there are 640 pixels horizontally for the time-axis."

The result appears like a strip chart with Doppler shift on the vertical axis, and time along the horizontal axis. The doppler axis typically spans 256 pixels that represent either 25 Hz, 12.5 Hz, or 6.25 Hz Doppler, i.e., tracking some rather narrow frequency disturbances. The time axis typically spans over several hours, often a full day and night. In such cases band "closing" and "openings" are distinct and reveal several complex ionospheric mechanics such as meteor pings, sporadic E, F layer propagation, and rays splitting into (O)rinary and (X)traordinary components. Even reflections from aircraft can be identified.

Peter indicated that he will be publishing some of this work and that would be something to look forward to. We are most grateful for his permission to show some examples of this work at the DCC.

--Johan

From nuucp@ihig2.firewall.lucent.com Tue Sep 24 12:02:50 1996

Received: from ihgw2.lucent.com (ihgw2.att.com [207.19.48.2]) by tapr.org (8.7.5/8.7.3/1.9) with SMTP id MAA06824 for <hfsig@tapr.org>; Tue, 24 Sep 1996 12:02:49 -0500 (CDT)

To: hfsig@tapr.org

Received: by ihig2.firewall.lucent.com (SMI-8.6/EMS-L sol2)  
id LAA05191; Tue, 24 Sep 1996 11:58:36 -0500  
Date: Tue, 24 Sep 1996 11:58:36 -0500  
From: nuucp@ihig2.firewall.lucent.com  
Message-Id: <199609241658.LAA05191@ihig2.firewall.lucent.com>  
Subject: UUCP command execution failed  
Content-Type: text  
Apparently-To: tapr.org!hfsig@ihig2.firewall.lucent.com

Your UUCP remote execution request 'igbAbb3e' (9/24-11:58:35)  
failed on system 'ihig2'.  
Your request: rmail bighorn.dr.lucent.com!grb  
Reason for failure: command exited with exit code 1

From karn@unix.ka9q.ampr.org Fri Sep 27 03:20:02 1996  
Received: from unix.ka9q.ampr.org (karn@unix.ka9q.ampr.org [129.46.90.35]) by  
tapr.org (8.7.5/8.7.3/1.9) with ESMTP id DAA15212 for <hfsig@tapr.org>; Fri, 27  
Sep 1996 03:20:00 -0500 (CDT)  
Received: (from karn@localhost) by unix.ka9q.ampr.org (8.7.4/8.7.3) id BAA16824;  
Fri, 27 Sep 1996 01:19:42 -0700 (PDT)  
Date: Fri, 27 Sep 1996 01:19:42 -0700 (PDT)  
Message-Id: <199609270819.BAA16824@unix.ka9q.ampr.org>  
From: Phil Karn <karn@unix.ka9q.ampr.org>  
To: hfsig@tapr.org, tcp-group@ucsd.edu  
Cc: robert@spectra.eng.hawaii.edu, harit@spectra.eng.hawaii.edu,  
simon@augean.eleceng.adelaide.edu.au  
Subject: Reed-Solomon encoder/decoder code available

Hi. I've just released the Reed-Solomon software I've been working on  
lately.

The software can encode and decode Reed-Solomon codes with symbol  
sizes ranging from  $2^2$  to  $2^{16}$  bits. The default parameters are for  
the (255,223) code with 8-bit symbols that was used on the Voyager-2  
spacecraft at Uranus and Neptune.

The files are as follows:

<http://www.qualcomm.com/people/pkarn/feccode/rs-readme>  
<http://www.qualcomm.com/people/pkarn/feccode/rs.zip>  
<http://www.qualcomm.com/people/pkarn/feccode/rs.tar.gz>

I've also updated my ham radio digital communications page  
(<http://www.qualcomm.com/people/pkarn/ham.html>) with pointers to these  
files. Enjoy!

Phil

From jsanford@mailhost.infi.net Fri Sep 27 07:10:14 1996  
Received: from mh004.infi.net (mh004.infi.net [198.22.1.119]) by tapr.org

(8.7.5/8.7.3/1.9) with SMTP id HAA20137 for <hfsig@tapr.org>; Fri, 27 Sep 1996 07:10:12 -0500 (CDT)  
Received: from PENTIUM by mh004.infi.net with SMTP  
(Infinet-S-3.3) id IAA13490; Fri, 27 Sep 1996 08:10:20 -0400 (EDT)  
Message-ID: <324BBF42.6A57@mailhost.norfolk.infi.net>  
Date: Fri, 27 Sep 1996 07:49:22 -0400  
From: Jim Sanford <jsanford@mailhost.infi.net>  
Reply-To: WB4GCS@AMSAT.ORG  
Organization: wb4gcs@amsat.org  
X-Mailer: Mozilla 3.0 (Win16; U)  
MIME-Version: 1.0  
To: hfsig@tapr.org  
Subject: Re: [HFSIG:1544] Reed-Solomon encoder/decoder code available  
References: <199609270819.BAA16824@unix.ka9q.ampr.org>  
Content-Type: text/plain; charset=us-ascii  
Content-Transfer-Encoding: 7bit

Phil Karn wrote:

>  
> Hi. I've just released the Reed-Solomon software I've been working on  
> lately.  
>  
> The software can encode and decode Reed-Solomon codes with symbol  
> sizes ranging from  $2^2$  to  $2^{16}$  bits. The default parameters are for  
> the (255,223) code with 8-bit symbols that was used on the Voyager-2  
> spacecraft at Uranus and Neptune.  
>  
> The files are as follows:  
>  
> <http://www.qualcomm.com/people/pkarn/feccode/rs-readme>  
> <http://www.qualcomm.com/people/pkarn/feccode/rs.zip>  
> <http://www.qualcomm.com/people/pkarn/feccode/rs.tar.gz>  
>  
> I've also updated my ham radio digital communications page  
> (<http://www.qualcomm.com/people/pkarn/ham.html>) with pointers to these  
> files. Enjoy!  
>  
> Phil  
Phil:  
THANK YOU!

All the best 73, Jim wb4gcs@amsat.org

From forrerj@peak.org Fri Sep 27 10:12:18 1996  
Received: from PEAK.ORG (root@PEAK.ORG [198.68.22.17]) by tapr.org  
(8.7.5/8.7.3/1.9) with SMTP id KAA25641 for <hfsig@tapr.org>; Fri, 27 Sep 1996 10:12:16 -0500 (CDT)  
Received: from p05.t0.monrotel.com (p05.t0.monrotel.com [198.68.25.38]) by  
PEAK.ORG (8.6.13/8.6.7) with SMTP id IAA04514 for <hfsig@tapr.org>; Fri, 27 Sep 1996 08:12:27 -0700  
Message-Id: <199609271512.IAA04514@PEAK.ORG>  
X-Sender: forrerj@peak.org  
X-Mailer: Windows Eudora Version 1.4.4



Mime-Version: 1.0  
Content-Type: text/plain; charset="us-ascii"  
Date: Fri, 27 Sep 1996 08:08:29 -0800  
To: hfsig@tapr.org  
From: forrerj@peak.org (Johan Forrer)  
Subject: Re: [HFSIG:1544] Reed-Solomon encoder/decoder code available

Phil,

>Hi. I've just released the Reed-Solomon software I've been working on  
>lately.

Great! I have just the application for it.

Thanks much.

--Johan

From jsanford@mailhost.infi.net Fri Sep 27 12:06:17 1996  
Received: from mh004.infi.net (mh004.infi.net [198.22.1.119]) by tapr.org  
(8.7.5/8.7.3/1.9) with ESMTP id MAA00251 for <hfsig@tapr.org>; Fri, 27 Sep 1996  
12:06:16 -0500 (CDT)  
Received: from PENTIUM by mh004.infi.net with SMTP  
(Infinet-S-3.3) id NAA28883; Fri, 27 Sep 1996 13:06:24 -0400 (EDT)  
Message-ID: <324C0980.14F1@mailhost.norfolk.infi.net>  
Date: Fri, 27 Sep 1996 13:06:08 -0400  
From: Jim Sanford <jsanford@mailhost.infi.net>  
Reply-To: WB4GCS@AMSAT.ORG  
Organization: wb4gcs@amsat.org  
X-Mailer: Mozilla 3.0 (Win16; U)  
MIME-Version: 1.0  
To: hfsig@tapr.org  
Subject: Re: [HFSIG:1544] Reed-Solomon encoder/decoder code available  
References: <199609270819.BAA16824@unix.ka9q.ampr.org>  
Content-Type: text/plain; charset=us-ascii  
Content-Transfer-Encoding: 7bit

>  
> The files are as follows:  
>  
> <http://www.qualcomm.com/people/pkarn/feccode/rs-readme>  
> <http://www.qualcomm.com/people/pkarn/feccode/rs.zip>  
> <http://www.qualcomm.com/people/pkarn/feccode/rs.tar.gz>  
>  
> Phil  
Phil:  
What's the rs.zip and rs.tar.gz files -- different coding of same thing?  
Netscape choked on the .gz file . . . .  
(Windoze version)

thanks, Jim

From rwhiting@winternet.com Sun Sep 29 20:04:49 1996  
Received: from icicle.winternet.com (adm@icicle.winternet.com [198.174.169.5]) by tapr.org (8.7.5/8.7.3/1.9) with ESMTP id UAA18451 for <hfsig@tapr.org>; Sun, 29 Sep 1996 20:04:46 -0500 (CDT)  
Received: (from adm@localhost) by icicle.winternet.com (8.7.5/8.7.5) id UAA02558 for <hfsig@tapr.org>; Sun, 29 Sep 1996 20:04:42 -0500 (CDT)  
Date: Sun, 29 Sep 1996 20:04:42 -0500 (CDT)  
Posted-Date: Sun, 29 Sep 1996 20:04:42 -0500 (CDT)  
Message-Id: <199609300104.UAA02558@icicle.winternet.com>  
Received: from ppp-67-117.dialup.winternet.com(204.246.67.117) by icicle.winternet.com via smap (V2.0a1)  
id xma002539; Sun, 29 Sep 96 20:04:28 -0500  
X-Sender: rwhiting@mail.winternet.com  
X-Mailer: Windows Eudora Light Version 1.5.2  
Mime-Version: 1.0  
Content-Type: text/plain; charset="us-ascii"  
To: hfsig@tapr.org  
From: CDrentea@aol.com (by way of Rick Whiting <rwhiting@winternet.com>)  
Subject: New Book

I came across a new book you may want to take a look at: Digital Communications Techniques - Signal Design and Detection by Simon, Hinedi and Lindsey - ISBN # 0-13-200610-3. It has been recently published by Prentice Hall and costs about \$82 - 10% from Barnes and Noble.

Very comprehensive. Although this information exists partially in other books, the book presents the methods of coherent, noncoherent, partially coherent, and differentially coherent detection for various binary and M-ary coded and uncoded modulation techniques (BPSK, QPSK, MSK, MFSK, QASK, QAM, etc) that can be applied to the design of uncoded systems while the Ro-criterion (channel throughput in bits/sec/Hz) and bit error probability are used as the methodology for designing efficient coded digital radio communications circuits. The book has absolutely nothing on propagation phenomena per say (it would be too good to be true), but presents the communication channel methodically and much like an OSI-ISO seven layer digital communications model (old stuff for data communications in WANs and LANs, but a very "novel" idea for radio data communications).

Key concepts include scalar, vector, and waveform communications over the additive nonwhite (colored) Gaussian noise channels. Communications via Rayleigh and Rician fading (due to multipath) channels are also presented.

Enjoy!

From karn@unix.ka9q.ampr.org Mon Sep 30 03:55:29 1996  
Received: from unix.ka9q.ampr.org (karn@unix.ka9q.ampr.org [129.46.90.35]) by tapr.org (8.7.5/8.7.3/1.9) with ESMTP id DAA09525 for <hfsig@tapr.org>; Mon, 30 Sep 1996 03:55:27 -0500 (CDT)  
Received: (from karn@localhost) by unix.ka9q.ampr.org (8.7.4/8.7.3) id BAA23664; Mon, 30 Sep 1996 01:54:48 -0700 (PDT)

Date: Mon, 30 Sep 1996 01:54:48 -0700 (PDT)  
Message-Id: <199609300854.BAA23664@unix.ka9q.ampr.org>  
From: Phil Karn <karn@unix.ka9q.ampr.org>  
To: Jim Sanford <jsanford@mailhost.infi.net>  
CC: hfsig@tapr.org  
Reply-To: karn@qualcomm.com  
In-reply-to: <324C0980.14F1@mailhost.norfolk.infi.net> (message from Jim  
Sanford on Fri, 27 Sep 1996 12:15:17 -0500 (CDT))  
Subject: Re: [HFSIG:1547] Re: Reed-Solomon encoder/decoder code available

>What's the rs.zip and rs.tar.gz files -- different coding of same thing?

Yes. The rs.zip file is a PKZIP-format file (primarily for DOS users) and the rs.tar.gz file is a GZIP-compressed tar archive (primarily for UNIX users). I say "primarily" because tools to read each format do exist on both platforms.

Note that the test driver program is intended for a UNIX environment and may require some tweaking to run under DOS, e.g, the library routines called to generate random numbers may have to be changed.

The actual RS subroutines are self-contained and should compile cleanly on any system that supports ANSI C.

Phil